ON BEST APPROXIMATION IN KM FUZZY METRIC SPACES

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Abstract

In this paper we introduce the notation of t-best approximatively compact sets, t-best approximation points, t-proximinal sets, t-boundedly compact sets and t-best proximity pair in fuzzy metric spaces. The results derived in this paper are more general than the corresponding results of metric spaces, fuzzy metric spaces, fuzzy normed spaces and probabilistic metric spaces.

Keywords: best approximation, topology, fuzzy metric spaces
Mathematics Subject Classification [2010]: 54A40, 41A50

1 Introduction

Kramosil and Michálek [5] introduced the fuzzy metric space by generalizing the concept of probabilistic metric space to the fuzzy situation with the help of continuous t-norm. Best approximation has important applications in diverse disciplines of mathematics, engineering and economics in dealing with problems arising in: Fixed point theory, Approximation theory, game theory, mathematical economics, best proximity pairs, Equilibrium pairs, etc. Many authors have studied best approximation and best proximity pair in the both metric and fuzzy metric spaces. Also Best approximation has important applications in diverse disciplines of mathematics, engineering and economics in dealing with problems arising in: Fixed point theory, Approximation theory, game theory, mathematical economics, best proximity pairs, Equilibrium pairs, etc. Many authors have studied best approximation and best proximity pair in the both metric and fuzzy metric spaces (e. g. see [1,6,7,9–11]). Best proximity pair theorems in the metric space (X, d) are consider to expound the sufficient conditions that ensure the existence of $x \in A$ such that $d(x, Tx) = d(A, B) := \inf\{d(a, b); a \in A, b \in B\}$, where $T : A \to 2^B$ is a multifunction defined on suitable subsets A, B of X. Also, a best proximity pair theorem evolves as a generalization of the problem, considered by Beer and Pai [1], Sahney and Singh [6], Singer [8] and Xu [11], of exploring the sufficient conditions for the non-emptiness of the set $\mathrm{Prox}(A, B) = \{(a, b) \in A \times B : d(a, b) = d(A, B)\}$, where A, B are suitable subsets of metric or linear normed space X. In this paper, we generalize some notions, definitions and results in [4, 7–10] such as set of best approximation points, proximinal sets

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